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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/517,895 | 12/13/2004 | Masahiro Inoue | F-8488 | 5714 |
| 28107 7590 04/17/2008 JORDAN AND HAMBURG LLP 122 EAST 42ND STREET SUITE 4000 NEW YORK, NY 10168 | | | | |
| EXAMINER SCHINDLER, DAVID M | | | | |
| ART UNIT | | PAPER NUMBER | | |
| 2862 | | | | |
| MAIL DATE | | DELIVERY MODE | | |
| 04/17/2008 | | PAPER | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/517,895

Applicant(s)

INOUE, MASAHIRO

Examiner

DAVID M. SCHINDLER

Art Unit

2862

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3, 5 and 8-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5, 10 and 11 is/are allowed.
- 6) ☒ Claim(s) 3, 8, 9 and 12-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 2/15/2008
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. This action is in response to the communication filed 1/9/2008. In view of applicant's amendments, the 35 U.S.C. 112 rejections of the previous office action are withdrawn. Additionally, the claim objection of claim 6 is withdrawn. Upon further consideration, the allowance of claims 8 and 15 are withdrawn in view of the rejections noted below.

Information Disclosure Statement

2. The information disclosure statement filed 2/15/2008 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. Therefore, the reference JP 56 110304 has not been considered.

Response to Arguments

3. Applicant's arguments with respect to the pending claims have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 12 is rejected under 35 U.S.C. 102(b) as being anticipated by Okada et al. (Okada) (US 2002/0130655).
6. As to Claim 12,
7. Okada discloses a rolling element (2D) in the form of an inner bearing ring (Figure 9), a non-rolling element (1) disposed concentrically with the rolling element, the non-rolling element being in the form of an outer bearing ring (Figure 9A), a rotation detector for outputting an induced voltage produced by an input exciting voltage according to a relative rolling element and the non-rolling element ((Page 2, Paragraph [0012]) and (Page 11, Paragraph [0147])), a generator for generating a voltage using energy provided by relative rotation of the rolling element relative to the non-rolling element and inputting the voltage as an input exciting voltage to the rotation detector, the generating having a first portion mounted to the inner bearing ring and a second portion mounted to the outer bearing ring ((Page 2, Paragraphs [0012], [0013]) and [0017]) and (Figure 9A).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 3 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al. (Watanabe) (5,914,548) in view of Makiuchi (JP 2000258187).

11. As to Claim 3,

12. Watanabe discloses a rolling element (12) formed as an inner ring of a bearing, a non-rolling element (11)

disposed concentrically with the rolling element, and a rotation detector (26) for outputting an input exciting voltage by converting it to an induced voltage according to a relative rolling state of the rolling element and the non-rolling element, the rotation detector including a rotor (29) (Figure 4), a stator (28) provided in the non-rolling element, and an exciting winding and output windings wound to the stator, wherein the output windings induce a voltage according to a gap permeance between the rotor and the stator in response to the exciting voltage inputted to the exciting winding (note variable reluctance resolver in column 7, Lines 1-10), the stator including a plurality of polar teeth opposing the rolling element, the exciting winding and output windings being wound to each polar teeth of the stator, the rotor on a portion of a circumferential surface of the inner ring which opposes the plurality of teeth and is an outer peripheral shoulder of the inner ring ((Figures 2 and 4) and (Column 4, Lines 44-62) and (Column 6, Lines 40-54 and lines 66-67) and (Column 7, Lines 1-37) and (Column 9, Lines 19-25 and lines 55-67) and (Column 15, Lines 11-21)).

13. Watanabe does not disclose the rotor provided as part of the inner ring and the rotor including a flat portion on a

circumferential surface of the inner ring which opposes the plurality of polar teeth.

14. Makiuchi discloses the rotor provided as part of the inner ring and the rotor including a flat portion on a circumferential surface of the inner ring which opposes the plurality of polar teeth (Figure 1).

15. It would have been obvious to a person of ordinary skill in the art to modify Watanabe to include the rotor provided as part of the inner ring and the rotor including a flat portion on a circumferential surface of the inner ring which opposes the plurality of polar teeth as taught by Makiuchi in order to reduce the amount of components needed to form the rotor.

16. As to Claim 21,

17. Watanabe discloses a rolling element including a first raceway wheel, a non-rolling element disposed concentrically with the rolling elements and including a second raceway wheel, the rolling element rolling with respect to the non-rolling element, a rotation detector providing an induced voltage output produced from an input voltage and influenced according to a gap permeance related to a relative rolling state of the rolling element and the non-rolling element, a rotor disposed on the rolling element, a stator disposed in the non-rolling element, an exciting winding and output windings disposed on the stator,

the exciting winding being excited by the exciting voltage and the output winding providing the induced voltage output, the rotor and the state being disposed opposing one another in an annular space between the rolling element and the non-rolling element (note Figure 2 in conjunction with Figure 4), and the output windings outputting the induce voltage at a level determined by the gap permeance between the rotor and the stator and by the input exciting voltage, wherein the rolling element is an inner ring of a bearing and the non-rolling element is an outer ring of the bearing ((Figures 2-4) and (Column 4, Lines 44-62) and (Column 6, Lines 40-54 and lines 66-67) and (Column 7, Lines 1-37) and (Column 9, Lines 19-25 and lines 55-67) and (Column 15, Lines 11-21)).

18. Watanabe does not disclose the rotor is disposed in the rolling element and the rotor is formed of the inner ring and includes a flat portion of an outer circumferential surface of the inner ring.

19. Makiuchi discloses the rotor is disposed in the rolling element and the rotor is formed of the inner ring and includes a flat portion of an outer circumferential surface of the inner ring (Figure 1).

20. It would have been obvious to a person of ordinary skill in the art to modify Watanabe to include the rotor is disposed in

the rolling element and the rotor is formed of the inner ring and includes a flat portion of an outer circumferential surface of the inner ring as taught by Makiuchi in order to reduce the amount of components needed to form the rotor.

21. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al. (Watanabe) (5,914,548) in view of Sakamoto (US 5,263,366).

22. As to Claim 8,

23. Watanabe discloses a rolling element, a non-rolling element disposed concentrically with the rolling element, and a rotation detector for outputting an input exciting voltage by converting it to an induced voltage according to a relative rolling state of the rolling element and the non-rolling element, the rotation detector including a rotor provided on the rolling element, a stator provided on the non-rolling element, and an exciting winding and output windings wound to the stator, wherein the output windings induce a voltage according to a gap permeance between the rotor and the stator in response to the exciting voltage inputted to the exciting winding, the stator including a plurality of polar teeth provided in a surface of the non-rolling element which opposes the rolling element while the exciting winding and output windings are wound to each polar teeth of the stator ((Figures 2 and 4) and (Column 4, Lines 44-

62) and (Column 6, Lines 40-54 and lines 66-67) and (Column 7, Lines 1-37) and (Column 9, Lines 19-25 and lines 55-67) and (Column 15, Lines 11-21)).

24. Watanabe does not disclose the rolling element includes a hub wheel, and an inner ring fitted on an outer periphery of the hub wheel, and the rotor being a nut mounted on the hub wheel so as to secure the inner ring to the hub wheel wherein the nut includes a flat portion which opposes the plurality of teeth.

25. Sakamoto discloses the rolling element includes a hub wheel (Figure 2), and an inner ring (16) fitted on an outer periphery of the hub wheel, and the rotor being a nut mounted on the hub wheel so as to secure the inner ring to the hub wheel wherein the nut includes a flat portion ((Figure 2) and (Column 6, Lines 36-68)).

26. It would have been obvious to a person of ordinary skill in the art at the time of invention to modify Watanabe to include the rolling element includes a hub wheel, and an inner ring fitted on an outer periphery of the hub wheel, and the rotor being a nut mounted on the hub wheel so as to secure the inner ring to the hub wheel wherein the nut includes a flat portion which opposes the plurality of teeth given the above disclosure and teaching of Sakamoto in order to allow for a smaller sized

device (Column 6, Lines 66-68) and to reduce the number of components needed by using the nut as the rotor.

27. As to Claim 9,

28. Watanabe does not disclose the hub wheel has first and second axial ends, the hub wheel has in sequential order a flange provided proximate the first axial end, a ring seat surface having a ring seat diameter and a threaded portion having an outer thread diameter less than the ring seat diameter, the inner ring is mounted on the ring seat surface, the threaded portion is at the second axial end of the hub wheel, and the nut is mounted to the hub wheel by being threaded on the threaded portion, the rotor being formed by the nut, the non-rolling element is an outer ring disposed concentrically about the hub wheel, a cap is mounted in an opening of the outer ring, and the stator is fixed to an inner periphery of the cap and the stator opposes the nut in a radial direction.

29. Sakamoto discloses the hub wheel has first and second axial ends, the hub wheel has in sequential order a flange (11) provided proximate the first axial end, a ring seat surface (note the area ring 16 is seated in) having a ring seat diameter and a threaded portion having an outer thread diameter less than the ring seat diameter, the inner ring is mounted on the ring seat surface (Figure 2), the threaded portion is at the second

axial end of the hub wheel, and the nut is mounted to the hub wheel by being threaded on the threaded portion, the rotor being formed by the nut, the non-rolling element is an outer ring disposed concentrically about the hub wheel, a cap is mounted in an opening of the outer ring, and the stator is fixed to an inner periphery of the cap and the stator opposes the nut in a radial direction ((Figure 2) and (Column 6, Lines 36-68)).

30. It would have been obvious to a person of ordinary skill in the art at the time of invention to modify Watanabe to include the hub wheel has first and second axial ends, the hub wheel has in sequential order a flange (11) provided proximate the first axial end, a ring seat surface (note the area ring 16 is seated in) having a ring seat diameter and a threaded portion having an outer thread diameter less than the ring seat diameter, the inner ring is mounted on the ring seat surface (Figure 2), the threaded portion is at the second axial end of the hub wheel, and the nut is mounted to the hub wheel by being threaded on the threaded portion, the rotor being formed by the nut, the non-rolling element is an outer ring disposed concentrically about the hub wheel, a cap is mounted in an opening of the outer ring, and the stator is fixed to an inner periphery of the cap and the stator opposes the nut in a radial direction as taught by Sakamoto in order to allow for a smaller sized device (Column 6,

Lines 66-68), to reduce the number of components needed by using the nut as the rotor, and to provide for vehicular rotation detection.

31. Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al. (Watanabe) (5,914,548) in view of Okada et al. (Okada) (US 2002/0130655).

32. As to Claim 12,

33. Watanabe discloses a rolling element in the form of an inner bearing ring, a non-rolling element disposed concentrically with the rolling element, the non-rolling element being in the form of an outer bearing ring, a rotation detector for outputting an induced voltage produced by an input exciting voltage according to a relative rolling state of the rolling element and the non-rolling element, and a generator (note (45) in Figure 3) for generating a voltage in accordance with rotation of the rolling element and inputting as an input exciting voltage to the rotation detector, the generator having a first portion mounted to the inner bearing ring and a second portion mounted to the outer bearing ring ((Figures 2-4) and (Column 4, Lines 44-62) and (Column 6, Lines 40-54 and lines 66-67) and (Column 7, Lines 1-37) and (Column 9, Lines 19-25 and lines 55-67) and (Column 15, Lines 11-21)).

34. Watanabe does not disclose the generator for generating a voltage uses energy provided by relative rotation of the rolling element relative to the non-rolling element.

35. Okada discloses the generator for generating a voltage uses energy provided by relative rotation of the rolling element relative to the non-rolling element ((Page 2, Paragraphs [0012], [0013]) and [0017]) and (Figure 9A).

36. It would have been obvious to a person of ordinary skill in the art at the time of invention to modify Watanabe to include the generator for generating a voltage uses energy provided by relative rotation of the rolling element relative to the non-rolling element as taught by Okada in order to eliminate the need for a electric power supply cable so that there is no possibility that the cable can be broken, thereby eliminating any complicated and time-consuming wiring job while contributing to the reduction in weight and cost of the vehicle (Page 2, Paragraph [0013]).

As to Claim 13,

Watanabe in view of Okada discloses a generating rotor provided as the first portion in the rolling element by disposing magnetic poles magnetic poles with different polarities alternately in a circumferential direction, and a generating stator provided as the second portion in the non-

rolling element, which has an electric coil opposing the magnetic poles of the generating rotor in an radial direction ((Figures 2-4) and (Column 4, Lines 44-62) and (Column 6, Lines 40-54 and lines 66-67) and (Column 7, Lines 1-37) and (Column 9, Lines 19-25 and lines 55-67) and (Column 15, Lines 11-21)).

As to Claim 14,

Watanabe does not disclose a radio transmitter for radio-transmitting signals outputted from the rotation detector to a signal processing unit provided outside.

Okada discloses a radio transmitter for radio-transmitting signals outputted from the rotation detector to a signal processing unit provided outside ((Page 2, Paragraphs [0012], [0013]) and [0017]) and (Figure 9A).

It would have been obvious to a person of ordinary skill in the art at the time of invention to modify Watanabe to include a radio transmitter for radio-transmitting signals outputted from the rotation detector to a signal processing unit provided outside as taught by Okada in order to eliminate the use of cabling that can become damaged (note paragraph [0013] on page 2).

37. Claims 15-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe et al. (Watanabe) (5,914,548) in view

of Makiuchi (JP 2000258187) and Okada et al. (Okada) (US 2002/0130655).

As to Claim 15,

Watanabe discloses a rolling element, a non-rolling element disposed concentrically with the rolling element, and a rotation detector for outputting an input exciting voltage by converting it to an induced voltage according to a relative rolling state of the rolling element and the non-rolling element, the rotation detector including a rotor provided on the rolling element, a stator provided on the non-rolling element, and an exciting winding and output windings wound to the stator, wherein the output windings induce a voltage according to a gap permeance between the rotor and the stator in response to the exciting voltage inputted to the exciting winding, the stator including a plurality of polar teeth provided in a surface of the non-rolling element which opposes the rolling element while the exciting winding and output windings are wound to each polar teeth of the stator, the rotor including a portion on a circumferential surface of the rolling element which opposes the plurality of polar teeth, a generator (note (45) in Figure 3) for generating a voltage in accordance with rotation of the rolling element and inputting as an input exciting voltage to the rotation detector, the generator having a first portion

mounted to the inner bearing ring and a second portion mounted to the outer bearing ring (Figures 2 and 4) and (Column 4, Lines 44-62) and (Column 6, Lines 40-54 and lines 66-67) and (Column 7, Lines 1-37) and (Column 9, Lines 19-25 and lines 55-67) and (Column 15, Lines 11-21)).

38. Watanabe does not disclose the rotor including a flat portion on a portion of a circumferential surface of the rolling element which opposes the plurality of polar teeth, a radio transmitter for radio-transmitting signals outputted from the rotation detector to a signal processing unit provided outside, and the generator for generating a voltage uses energy provided by relative rotation of the rolling element relative to the non-rolling element.

Makiuchi discloses the rotor including a flat portion on a portion of a circumferential surface of the rolling element which opposes the plurality of polar teeth (Figure 1).

It would have been obvious to a person of ordinary skill in the art to modify Watanabe to include the rotor including a flat portion on a portion of a circumferential surface of the rolling element which opposes the plurality of polar teeth as taught by Makiuchi in order to reduce the amount of components needed to form the rotor.

Okada discloses the generator for generating a voltage uses energy provided by relative rotation of the rolling element relative to the non-rolling element ((Page 2, Paragraphs [0012], [0013]) and [0017]) and (Figure 9A), and a radio transmitter for radio-transmitting signals outputted from the rotation detector to a signal processing unit provided outside ((Page 2, Paragraphs [0012], [0013]) and [0017]) and (Figure 9A).

39. It would have been obvious to a person of ordinary skill in the art at the time of invention to modify Watanabe to include a radio transmitter for radio-transmitting signals outputted from the rotation detector to a signal processing unit provided outside, and the generator for generating a voltage uses energy provided by relative rotation of the rolling element relative to the non-rolling element as taught by Okada in order to eliminate the need for cabling that can become damaged (see Page 2, Paragraph [0013]).

As to Claim 16,

Watanabe discloses a signal processing unit for processing output signals from the rotation detector (Column 9, Lines 4-19).

As to Claim 17,

Watanabe discloses a signal processing unit for processing output signals from the generator (Column 9, Lines 4-19).

As to Claim 18,

Watanabe does not disclose a signal processing unit for processing output signals from the radio transmitter.

Okada discloses a signal processing unit for processing output signals from the radio transmitter (Figure 29).

It would have been obvious to a person of ordinary skill in the art at the time of invention to modify Watanabe to include a signal processing unit for processing output signals from the radio transmitter as taught by Okada in order to provide for a device that can determine the rotational position of the rotor with greater mobility relative to a processing device that requires cabling connected to the sensor.

As to Claim 19,

Watanabe discloses the rotation detector includes a resolver which induces the voltage according to a gap permeance between the rotor and the stator in response to an exciting voltage inputted to the exciting winding from the output windings ((Figures 2-4) and (Column 4, Lines 44-62) and (Column 6, Lines 40-54 and lines 66-67) and (Column 7, Lines 1-37) and (Column 9, Lines 19-25 and lines 55-67) and (Column 15, Lines 11-21)).

As to Claim 20,

Watanabe discloses the non-rolling element opposes the rolling element at least in part in a radial direction of the rolling bearing apparatus (Figures 2-4).

Allowable Subject Matter

40. Claims 5, 10, and 11 are allowed.

41. The following is an examiner's statement of reasons for allowance:

As to Claim 5,

The primary reason for the allowance of claim 5 is the inclusion of the second inner circumferential surface being out of contact with the inner ring outer circumferential surface end portion of the another one of the inner rings such that the rotor does not contact the another one of the rings. It is these features found in the claim, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art.

As to Claim 10,

The primary reason for the allowance of claim 10 is the inclusion of the stator being mounted in an axially center region of an inner circumferential surface of the outer ring, and the rotor being formed by at least one notch provided at an area on the intermediate circumferential surface of the hub

wheel. It is these features found in the claim, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art.

As to Claim 11,

The primary reason for the allowance of claim 11 is the inclusion of the stator being mounted in an axially center region of an inner circumferential surface of the outer ring, and the rotor being formed by notches provided at a plurality of areas on the intermediate circumferential surface. It is these features found in the claim, as they are claimed in the combination that has not been found, taught or suggested by the prior art of record, which makes this claim allowable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID M. SCHINDLER whose telephone number is (571)272-2112. The examiner can normally be reached on Monday-Friday (8:00AM-5:00PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Assouad can be reached on (571) 272-2210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

David M. Schindler

Art Unit: 2862

Examiner
Art Unit 2862

DMS

/Patrick J Assouad/

Supervisory Patent Examiner, Art Unit 2862